## REMARKS

Reconsideration of the application is requested in view of above amendments and the following remarks and accompanying evidence.

When this application was filed as a CPA on April 30, 2002, a suspension of action for three months was requested. This response is being submitted within the 3-month suspension period.

An Official Action (final rejection) issued in this application on May 20, 2002, contrary to the request for suspension. A response to this premature final rejection was filed June 5, 2002, and the Examiner in charge of the application was telephoned to advise that the final rejection was contrary to the request for suspension. Accordingly, it is submitted that the present amendment should be entered as a matter of right.

By this amendment, claims 53-58 and 61 are revised to better define the invention, particularly to meet the Examiners objection by placing elements of the preamble in the body of the claim. Other clarifying language changes are made to better define the invention. Claim 59 is canceled because it is a substantial duplicate of claim 58. New claims 66-76 are added to claim the invention as a method of operating a temperature raising system and entry of the amendments is requested .

In the Advisory Action of April 5, 2002, the Examiner noted that the preamble of Applicant's claims is in the form of "intended use" and is not given patentable weight. By this amendment, the language from the preamble is included in the body of the claims as steps (a) and (b). Therefore, these steps and the overall combination of steps must be given patentable weight.

The specification is also objected to under 37 CFR 1.71 on the ground that the originally filed specification fails to disclose the elected invention and species having the vapor directly

contacting the first medium and the heat source. A rejection of claims 53-61 is also made under 35 USC 112 for the same reason. Reconsideration of this rejection is requested.

Apparently this rejection is based on the language of the claims which state that the first heat carrying medium and the heat source may be "directly or indirectly" contacted. By this amendment, this language is deleted from the claims. While a substantial portion of applicant's specification is concerned with indirect contact of the heat carrying medium and the heat source, the Examiners attention is directed to page 15, beginning at line 17, where different operational methods are disclosed. At page 15, lines 19-23, a method is described wherein the heat source and the heat carrying medium do not make direct contact, that is an indirect contact system. However, at page 15, lines 23-26 the specification clearly points out how the method is conducted when the heat source and the HCM medium make direct contact. Therefore, since the specification does provide the necessary support and written description basis for both direct and indirect contact, withdrawal of the objection to the specification and rejection of the claims are believed to be in order, and reconsideration is requested.

Claims 53-61 also stand rejected as obvious and unpatentable over the Cheng patent 5,526,653 in view of newly cited U.S. patent 4,253,518 to Minesi. The Examiner considers that the Cheng patent discloses all the claimed features of the invention with the exception of the claimed mixture of compounds and a pressure changing device. The Examiner considers it would have been obvious to one of ordinary skill at the time the invention was made to use the claimed mixture of compounds since it is within the general skill of a worker in the art to select a known material on the basis of its suitability for an intended use as a matter of obvious design choice. Further Minesi is relied on as disclosing a heat pipe having a pressure changing device

for the purpose of operating within a desired temperature range. As applied to the amended and new claims, this rejection is again respectfully traversed and reconsideration is requested.

New claims 66-76 are also directed to the elected invention but define the claimed method in a more specific manner. It is submitted that these claims are also clearly patentable over the references of record.

It is first pointed out that it would not have been obvious to one of ordinary skill in the art at the time the invention was made to use the claimed mixture of compounds because there is no motivation in the Cheng patent to lead one of skill in the art to use the claimed mixture of compounds. Thus the conclusion of the Examiner is clearly based on hindsight and is improper. Further there is no suggestion in either of the references that the heat pipe and pressure changing device of Minesi could be incorporated into the system of Cheng for the purpose of the claims. Any such suggestions must be made by the references themselves and clearly that is not the case here. In re Schaffer, 108 US.P.Q, 326; In re Shapleigh, 115 US.PQ 129. Clearly, Minesi is concerned with a different problem and a different system.

As pointed out in Schaffer, it is not enough for a valid rejection to view the prior art in retrospect once an applicant's disclosure is known. The art applied should be viewed by itself to see if it is fairly discloses doing what an applicant has done.

The problem with this prior art rejection is that there is no motivation in either of the references relied on by the Examiner to suggest this combination. In re Antonie, 195 USPG. (CCPA 1977); In re Kratz, 201 USPQ71. Further, as pointed out by the Board of Appeals in Ex parte Levengood, 27 USPG 2d 1300, the "Examiner cannot establish obviousness through references describing various aspects of applicant's invention unless the Examiner also provides

evidence of motivating force to impel a person skilled in the art to do what applicant has done". Applicant submits that here, for reasons pointed out below, there is no motivation to be found in the references to combine them for any reason.

The Examiner's attention is also respectfully invited to the recent Federal Circuit decision, In re Lee, 61 USPQ 2d 1430. In this case the court held that the factual question of motivation is material to patentability, and cannot be resolved on subjective belief and unknown authority, but rather must be based on objective evidence of record. In other words, the court held that an examiners conclusion on the question of obviousness cannot be subjective but must be supported by the evidence, that is the references on which the obviousness rejection is based. Therefore, in this application, the Examiner's conclusion that the claimed invention is obvious must find basis in the references themselves.

As pointed out previously, the patent to Cheng discloses an air conditioning system where the method consists of taking in heat from a first mass of air at a first temperature by vaporizing a mass of water under a reduced pressure, upgrading the heat by absorbing the water vapor into an absorbing solution and discharging the heat of absorption at an elevated temperature to a second air mass or cooling water. This is clearly a different system than is claimed herein. As will be noted from applicant's claims, the main claim requires that the heat be transferred from a heat source to a heat sink where the temperature of the heat sink is higher than the temperature of the heat source. This is not suggested in the Cheng patent. Further applicant's claims require a step of applying a first pressure to the heat temperature raising medium, and changing the pressure applied to the heat temperature raising medium from a first pressure to a second pressure, whereby heat is transferred by latent heat of fusion from the heat

temperature raising medium to a second heat carrying medium. None of these steps are taught or suggested by the Cheng reference. Therefore, applicant's position is that the patent to Cheng is not concerned with the same invention as required by applicant's claim, does not disclose Applicant's method steps, and does not disclose or suggest the sequence of steps the references do not disclose or suggest the sequence of steps required by the Applicant's claims. Therefore, the patent to Cheng is not sufficient to raise a prima facia case of obviousness against the claimed subject matter.

The Examiner takes the position that the Cheng '653 patent discloses all the claimed features of the invention except for the pressure changing device which is made obvious by newly cited Minesa, and the use of the claimed mixture of compounds. The patent to Minesa is directed to a cooling installation system wherein a chamber is connected to an expansion vessel through a valve calibrated at a predetermined opening pressure depending on the nature of the heat carrier fluid and on the maximum temperature desired within the chamber and/or on the element to be cooled. In other words, the Minesi device includes an expansion vessel which has a valve calibrated at a pressure at which it will open depending on the nature of the heat carrier fluid and on the maximal temperature desired inside the chamber. The Minesa device is a cooling installation which works through a change in phase which can be applied to electronic circuits. The only function of the pressure valve is that is opens at a predetermined or set pressure depending on the nature of the liquid. This is irrelevant to the requirements of Applicant's claims and there is no suggestion in the Minesi reference as to how this pressure valve could be incorporated into the Cheng apparatus to result in Applicant's invention. Accordingly the combination is improper under 35 U.S.C. 103.

The applicant's claims require that a first pressure be applied to the heat temperature raising medium and this pressure is then changed from a first pressure to a second pressure to produce a vapor of the heat temperature raising medium which is then transferred to the heat sink. Neither of these steps are suggested by either of the references relied on by the Examiner.

It is pointed out that the claimed process is an abnormal heat transfer process, whereby the heat will flow from a lower temperature heat source to a higher temperature heat sink, denoted as opposite direction operation, rather than from the natural course of heat flow which is from higher temperature heat source to a lower temperature heat sink. A comparison of the Cheng process, the Minesi process and the claimed process follows:

A. In Minesi patent number 4,253,518, the temperature of the heat element is higher than its condenser. This heat flow is a normal heat transfer phenomena, and clearly not related to the claimed process. Minesi's process is only a way of deairation for the condensing chamber to improve efficiency of the condenser, The claimed process does not include any deairation step. The only similarity is the name that Minesi used for his operating medium as an "heat carrying fluid". Other than the name of "heat carrying medium", in Applicant's invention. the two processes do not have any similarity in phenomena between them.

B. In patent 5,526,653 Cheng uses the phenomena of vapor absorption by solution, and further converts the latent heat of this vapor into sensible heat of absorbing solution to raise the temperature of the solution. After absorption of the vapor, it will then pass

the heat to a heat sink. In his patent, Cheng provided a way of abnormal heat flow using vapor absorption to facilitate an abnormal way of transferring the heat from lower temperature heat source to higher temperature heat sink. Cheng used a mechanism of vapor absorption to raise the temperature of the solution. This patent is similar to the claimed process only in the direction of operation of transferring heat flow, but all of the operating steps between the Cheng patent and the claimed process are different. The claimed process does not use a vapor absorption step, or an absorption solution, and the mechanisms are completely different.

C. The claimed process is as follows: A heat carrying vapor, denoted as HCM1 vapor, condenses on the surface of the HTR tubes to pass its latent heat of its vapor to melt HTRM inside HTR tubes. The latent heat of HCM1 vapor will become the latent heat of fusion of HTRM. After applying pressure to the HTRM inside of the HTR tube, the melting point of HTRM will increase, and latent heat of fusion of HTRM will elevate to the higher temperature. As one can see, this process is completely different from Cheng's patent process. The only similarity between the claims and Cheng's patent is the abnormal heat flow from low temperature to higher temperature. The processes are thus completely different.

It is submitted that the claimed process is not obvious nor derived from the combination of the two patents referred to. Clearly, the three processes discussed above are completely

different from each other. They are different in operating mechanism, and completely different in physical phenomena.

It is submitted that the references are deficient under 35 U.S.C. 103. The Examiner admits that the Cheng patent does not disclose the change in pressure requirements of applicant's claims. The pressure valve disclosed in the Minesi reference does not meet the deficiencies of the Cheng reference. Therefore the references are not combinable to raise a prima *facie* case of obviousness of the Applicant's claims. It is clear that Applicant's claims are directed to a novel method for transferring heat from a hear source to a heat sink which has a higher temperature than the heat source. Further the sequence of steps is novel and are neither taught nor suggested by the prior art. For these reasons, it is submitted that the references are clearly insufficient.

In support of Applicant's position however and to meet the new rejection raised by relevance on the newly cited Minesi patent, there is submitted herewith a Declaration by Chen-Yen Cheng, the inventor named in the reference Cheng patent 5,523,653. In this Declaration Under 37 CFR 1.132, Mr. Cheng acknowledges that he has read and understood this patent application Serial No.: 09/373,605 and understands the invention presented in the claims. Further Mr. Cheng acknowledges that nothing in his '653 patent would make obvious to him that heat could be transferred from a heat source to a heat sink which has a higher temperature than a heat source through the sequence of steps recited in Applicant's claims. Therefore, to the extent there is any presumption of obviousness resulting from the combination of references, this Declaration should be sufficient to rebut that presumption. Accordingly, withdrawal of the rejection is believed to be in order.

Attached hereto is a marked-up version of the changes made to the specification and the claims by the current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE**".

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

## IN THE CLAIMS

Claims 53, 54, 55, 56, 57, 58 and 61 have been amended as follows:

53. (Amended) A method for transferring heat from a heat source to a heat sink [where the temperature of the heat sink is higher than the temperature of the heat source], comprising the steps of:

(a) providing a heat source comprising a material having a temperature $T_L$;

(b) providing a heat sink comprising a material having a temperature $T_H$ wherein temperature $T_H$ is higher than temperature $T_L$;

[(a)] (c) providing a first heat carrying medium;

[(b)] (d) forming a heat carrying medium vapor by [direct or indirect] heat exchange contact between the first heat carrying medium and the heat source material;

[(c)] (e) transferring the heat from the heat carrying medium vapor to a heat temperature raising medium contained within a heat temperature [rising] raising unit that [includes] comprises a tube, a multiple tube assembly, multiple connected conduits, or multivoid metal blocks;

[(d)] (f) applying a first pressure to the heat temperature raising medium;

[(e)] (g) changing the pressure applied to the heat temperature raising medium from the first pressure to a second pressure to create a latent heat of fusion in the heat temperature raising medium;

[(f)] (h) transferring [heat via] the latent heat of fusion from the heat temperature raising medium to a second heat carrying medium to form a second heat carrying medium vapor, [whereby] the temperature of the second heat carrying medium [is] being higher than the temperature of the first heat carrying medium; and

[(g)] (i) transferring the latent heat [of] in the vapor of the second heat carrying medium to the material of the heat sink thereby raising the temperature $T_H$ in the material of heat sink.

54. (Amended) A method for transferring heat from a heat source to a heat sink [where the temperature of the heat sink is higher than the temperature of the heat source], comprising the steps of:

(a) providing a heat source comprising a material having a temperature $T_L$;

(b) providing a heat sink comprising a material having a temperature $T_H$, wherein temperature $T_H$ is higher than temperature $T_L$;

[(a)] (c) providing a first heat carrying medium;

[(b)] (d) forming a heat carrying medium vapor by [direct or indirect] heat exchange contact between the first heat carrying medium and the material of the heat source, [whereby] the temperature of the heat exchange [is above] being higher than the melting point of the material of the heat source;

[(c)] (e) transferring the heat from the heat carrying medium vapor to a heat temperature raising medium contained within a heat temperature [rising] raising unit that [includes] comprises a tube, a multiple tube assembly, multiple connected conduits, or multivoid metal blocks;

[(d)] (f) applying a first pressure to the heat temperature raising medium;

[(e)] (g) changing the pressure applied to the heat temperature raising medium from the first pressure to a second pressure to create a latent heat of fusion in the heat temperature raising medium;

[(f)] (h) transferring [heat via] the latent heat of fusion from the heat temperature raising medium to a second heat carrying medium to form a second heat carrying medium vapor, [whereby] the temperature of the second heat carrying medium [is] being higher than the temperature of the first heat carrying medium; and

[(g)] (i) transferring the latent heat [of] in the vapor of the second heat carrying medium to the material of the heat sink thereby raising the temperature $T_H$ in the material of the heat sink.

55. (Amended) A method for transferring heat from a heat source to a heat sink [where the temperature of the heat sink is higher than the temperature of the heat source], comprising the steps of:

(a) providing a heat source comprising a material having a temperature $T_L$;

(b) providing a heat sink comprising a material having a temperature $T_H$, wherein temperature $T_H$ is higher than temperature $T_L$;

[(a)] (c) providing a first heat carrying medium;

[(b)] (d) forming a heat carrying medium vapor by [direct or indirect] heat exchange contact between the first heat carrying medium and the heat source material;

[(c)] (e) transferring the heat from the heat carrying medium vapor to a heat temperature raising medium contained within a heat temperature [rising] raising unit that [includes] comprises a tube, a multiple tube assembly, multiple connected conduits, or multivoid metal blocks;

[(d)] (f) applying a first pressure to the heat temperature raising medium;

[(e)] (g) changing the pressure applied to the heat temperature raising medium from the first pressure to a second pressure to form a latent heat of fusion in the heat temperature raising medium;

[(f)] (h) transferring [heat via] the latent heat of fusion from the heat temperature raising medium to a second heat carrying medium to form a second heat carrying medium vapor, [whereby] the temperature of the second heat carrying medium [is] being higher than the temperature of the first heat carrying medium; and

[(g)] (i) transferring the latent heat [of] in the vapor of the second heat carrying medium to the material of the heat sink thereby raising the temperature $T_H$ in the material of the heat sink.

56. (Amended) The method as claimed in Claim 53, 54 or 55, wherein the heat temperature raising medium is selected from the group consisting of an organic or inorganic chemical, and mixtures thereof, either in a pure form or in a compound [with] having a melting point range between -30° C and 100° C, with the proviso that when the heat temperature raising medium is selected from a mixture of compounds, the mixture has a eutectic point range between –30° C and 100° C.

57. (Amended) The method as claimed in Claim 53, 54 or 55 wherein the step of transferring heat from a heat source via a first heat carrying medium to a heat sink comprises [a] multiple units of heat temperature raisers to elevate the temperature of the heat carrying medium by multiple steps.

58. (Amended) The method as claimed in Claim 53, 54 or 55, wherein said method of heat transfer is used in air-conditioning, distillative freezing, ice making, cable water purification, waste water treatment, desalination, distillation operation under ambient temperature or high temperature, or organic chemical purification and separation, [or in any other process requiring the use of raising the temperature from a lower temperature heat source to a high temperature heat sink].

61. (Amended) The method as claimed in Claim 53[, 54], 55, 56, 57, 58, 59 or 60, wherein heat conductive fins are positioned within the tube, the conduits of said multiple tube assembly, the tubes of said multiple connected tubes, or the voids of said multi-void block of the heat temperature rising unit.